

**Claims**

1. A transgenic cell comprising a nucleic acid molecule which comprises a nucleic acid sequence as represented in Figures 5a, 5b, 6a, 6c, 7a, 8a, 8b, 9a, 10a, 11a, 11b, 11d, or nucleic acid molecules which hybridise to these sequences, wherein said nucleic acid molecules encode a polypeptide which has desaturase activity.
2. A cell according to Claim 1 wherein said hybridisation conditions are stringent hybridisation conditions.
3. A cell according to Claim 1 or 2 wherein said nucleic acid molecule comprises the nucleic acid sequence as represented in Figures 5a, 5b, 6a, 6c, 7a, 8a, 8b, 9a, 10a, 11a, 11b, 11d.
4. A cell according to Claim 3 wherein said nucleic acid molecule consists of the nucleic acid sequence as represented in Figures 5a, 5b, 6a, 6c, 7a, 8a, 8b, 9a, 10a, 11a, 11b, 11d.
5. A cell according to any of Claims 1-4 wherein said cell over-expresses said desaturase encoded by said nucleic acid molecule.
6. A cell according to any of Claims 1-5 wherein said transgenic cell is transfected with a nucleic acid molecule comprising a nucleic acid sequence as represented by Figure 10a and which encodes a desaturase polypeptide wherein said polypeptide has  $\Delta 11$ -desaturase activity, or a nucleic acid molecule which hybridises to the nucleic acid molecule in Figure 10a and encodes a polypeptide with  $\Delta 11$ -desaturase activity.

7. A cell according to any of Claims 1-5 wherein said transgenic cell is transfected with a nucleic acid molecule comprising a nucleic acid sequence as represented by Figure 8a and which encodes a desaturase polypeptide wherein said polypeptide has  $\Delta 6$ -desaturase activity, or a nucleic acid molecule which hybridises to the nucleic acid molecule in Figure 8a and encodes a polypeptide with  $\Delta 6$ -desaturase activity.
8. A cell according to any of Claims 1-7 wherein said transgenic cell is a eukaryotic cell.
9. A cell according to any of Claims 1-7 wherein said cell is a prokaryotic cell.
10. A cell according to Claim 8 wherein said eukaryotic cell is a plant cell.
11. A plant comprising a cell according to Claim 8.
12. A seed comprising a cell according to Claim 9.
13. A plant or seed according to Claim 11 or 12 wherein said plant or seed is an oil seed plant.
14. A reaction vessel comprising at least one polypeptide encoded by a nucleic acid molecule wherein said nucleic acid molecule comprises a nucleic acid sequence consisting of the sequences as represented in Figures 5a, 5b, 6a, 6c, 7a, 8a, 8b, 9a, 10a, 11a, 11b, 11d, or nucleic acid molecules which hybridise to these sequences, and which encode a polypeptide which has desaturase activity; fatty acid substrates and co-factors wherein said vessel is adapted for the desaturation of said fatty acids substrates.

15. A vessel according to Claim 14 wherein said polypeptide is expressed by a cell according to the invention.

16. A vessel according to Claim 15 wherein said cell is a yeast cell.

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17. A vessel according to Claim 15 wherein said cell is a prokaryotic cell.

18. A method to desaturate a fatty acid substrate comprising the steps of:

- i) providing a reaction vessel according to any of Claims 14-17; and
- 10 ii) growing said cells contained in said reaction vessel under conditions which allow the desaturation of at least one fatty acid substrate.

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